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☒ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 310.00

Complete if Known

Application Number	10/772,595
Filing Date	February 5, 2004
First Named Inventor	Bokisa, et al.
Examiner Name	Edna Wong
Art Unit	1753
Attorney Docket No.	TASKP104US

METHOD OF PAYMENT (check all that apply)

☐ Check ☒ Credit card ☐ Money Order ☐ Other ☐ None

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Amin & Turocy, LLP

50-1063

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1) (\$)			

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims		-20** =		X		=	
Independent Claims		-3** =		X		=	
Multiple Dependent						=	

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1202 18	2202 9	Claims in excess of 20	
1201 86	2201 43	Independent claims in excess of 3	
1203 290	2203 145	Multiple dependent claim, if not paid	
1204 86	2204 43	** Reissue independent claims over original patent	
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2) (\$)			

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	107/2595
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	60.00
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for <i>ex parte</i> reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	60.00
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	250.00
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 310.00

SUBMITTED BY

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Signature		Date	June 1, 2006		

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10/772,595

TASKP104US



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Rebecca A. Bellas

(Type or print name of person mailing paper)

Date: June 1, 2006 Rebecca A. Bellas

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application

Applicant:	Bokisa, et al.	:	Art Unit:	1753
		:		
Serial No.:	10/772,595	:	Examiner:	Edna Wong
		:		
Filed:	February 5, 2004	:		
		:		
Title:	ELECTROPLATED QUATERNARY ALLOYS			

**Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

APPEAL BRIEF

Dear Sir:

Appellants' representative submits this brief in connection with an appeal of the above-identified patent application. If any additional fees are due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063.

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I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Taskem, Inc., the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellants, appellants' legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1-13 and 15-26 are pending in the application. The rejection of claims 1-13 and 15-26 is being appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

Claim amendments had been made and entered after the Final Office Action.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))**A. Independent Claim 1**

Independent claim 1 and its corresponding dependent claims relate to a method of electroplating a quaternary Ni-Co alloy. The method involves 1) providing an electroplating bath containing an anode, a cathode, water, ionic nickel, ionic cobalt, at least two ionic alloy metals, and at least one acetylenic brightener and 2) applying a current to the electroplating bath so that the quaternary Ni-Co alloy forms on the cathode.

B. Independent Claim 9

Independent claim 9 and its corresponding dependent claims relate to a method of electroplating an alloy containing nickel, cobalt, and at least two alloy metals. The method involves 1) providing an electroplating bath containing an anode, a cathode, water, about 40 g/l or more and about 100 g/l or less of ionic nickel, about 1 g/l or more and about 30 g/l or less of ionic cobalt, and about 0.05 g/l or more and about 10 g/l or less of each of at least two ionic alloy metals, and from about 0.005 % to about 2.5 % by weight of at least one acetylenic brightener and 2) applying a current to the electroplating bath so that the alloy forms on the cathode.

C. Independent Claim 18

Independent claim 18 and its corresponding dependent claims relate to a method of electroplating an alloy containing nickel, cobalt, and at least two alloy metals. The method involves 1) providing an electroplating bath containing an anode, a cathode substrate, water, ionic nickel, ionic cobalt, at least two ionic alloy metals, and at least two brighteners selected from sulfur containing brighteners and acetylenic brighteners and 2) applying a current to the electroplating bath so that the alloy forms on the cathode.

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

A. Whether claims 1-6, 8, and 24 are obvious over JP 10-245693 (hereinafter "JP '693") in view of Passal even though the cited art does not teach or suggest all of the features of the claims.

B. Whether claim 7 is properly rejected under 35 U.S.C. §103(a) over JP '693 in combination with Passal further in view of Hui.

C. Whether claims 9-12, 15-17, and 25 are properly rejected under 35 U.S.C. §103(a) over JP '693 in view of Passal.

D. Whether claim 13 is properly rejected under 35 U.S.C. §103(a) over JP '693 in combination with Passal further in view of SU 1,544,847 (hereinafter "SU '847").

E. Whether claims 18-23 and 26 are properly rejected under 35 U.S.C. §103(a) over JP '693 in view of Passal.

VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

A. Rejection of Claims 1-6, 8, and 24 Under 35 U.S.C. §103(a)

Claims 1-6, 8, and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP '693" in view of Passal. It is respectfully submitted that this rejection should be reversed for at least the following reasons. JP '693 and Passal, individually and in combination, do not teach or suggest all the features of the claimed invention.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the cited art or in the knowledge generally available to one of ordinary skill in the art, to modify or combine cited art teachings. Second, there must be a reasonable expectation of success. Finally, the cited art must teach or suggest all the claim features. See MPEP §706.02(j).

The claimed invention relates to making high quality quaternary Ni-Co alloys using a bath containing nickel ions, cobalt ions, two ionic alloy metals, and an acetylenic brightener. The high quality quaternary Ni-Co alloys are achievable due to the presence of the acetylenic brightener. This is because the presence of an acetylenic brightener causes the uniform placement of the two ionic alloy metals within the matrix of a Ni-Co base alloy. This action is not easy since each metal plates at a different rate depending upon conditions such as

temperature, concentration, pH, current, and the like. A more attractive quaternary alloy results because the four metals plate with substantially uniform distribution.

- i. **JP '693 and Passal, independently or in combination, fail to teach or suggest any quaternary alloys including quaternary Ni-Co alloys.**

The Examiner contends that JP '693 teaches a method of electroplating a quaternary alloy containing Ni, Co, and at least two ionic alloy metals. From this, the Examiner concludes that a combination of JP '693 and Passal would disclose a method of electroplating a quaternary Ni-Co alloy using a bath containing at least one acetylenic brightener, as required in claim 1. However, JP '693 generically discloses nickel alloys containing one or more of boron, cobalt, copper, iron, manganese, phosphorus, tin, and zinc. JP '693 does not disclose any quaternary alloys. The only alloys specifically mentioned in JP '693 are binary alloys and ternary alloys. Passal only teaches Ni, Co, and Ni-Co alloys. JP '693 and Passal, independently or in combination, fail to teach or suggest any quaternary alloys including quaternary Ni-Co alloys. Thus, the proposed combination fails to teach or suggest all the features of the claimed invention.

- ii. **There is no motivation to replace the quaternary ammonium salt of JP '693 with the acetylenic compound of Passal since Passal explicitly teaches that the proposed modification destroys the purpose and function of the invention disclosed in the cited art.**

Notwithstanding that the cited art does not teach or suggest all of the features of claim 1, there would have been no motivation or suggestion to combine the cited art in the manner suggested. In order to reject claims in an application pursuant to 35 U.S.C. §103, there must be some logical reason apparent from **positive, concrete evidence** of record, which justifies a combination of primary and secondary art. See *In re Lakowski* 871 F.2d 115; 10

U.S.P.Q.2D (BNA) 1397 (Fed. Cir. 1989) citing *In re Regel*, 526 F.2d 1399, 1403 n.6, 188 USPQ 136, 140 n.6 (CCPA 1975).

Moreover, if a reference is cited that requires some modification in order to meet the claimed invention or requires some modification in order to be properly combined with another cited art and such a modification destroys the purpose or function of the invention disclosed in the cited art, one of ordinary skill in the art would not have found a reason to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The Examiner contends that it would have been obvious to one having ordinary skill in the art to have modified the method described by JP '693 with an acetylenic brightener because acetylenic compounds are primary brighteners used in typical nickel-containing, cobalt-containing, and nickel cobalt-containing bath compositions as taught by Passal. The Examiner contends that one skilled in the art would have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal. Applicants respectfully disagree for at least the following reasons.

One skilled in the art would NOT have been motivated to replace the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal since Passal teaches that the addition of acetylenic compounds to a bath results in "a dark, thin, and badly striated electrodeposit" (column 1, lines 11-40). In the metal plating arts, the number of alloy species and the kind of alloy species substantially affect the characteristics of the alloy electrodeposit. Alloy-modifying agents, such as brighteners, substantially affect the nature of the alloy coating. In other words, a high degree of UNPREDICTABILITY exists in the electroplating art. For example, while a certain brightener may improve a binary alloy electroplating, the brightener may not improve a quaternary alloy electroplating.

Passal teaches an electroplating bath containing a combination of i) Ni, Co, or Ni-Co, ii) at least one of a primary brightener, secondary brightener, secondary auxiliary brightener, and anti-pitting agent, and iii) an organic hydroxy-sulfonate compound (column 1, lines 11-40). Passal requires three components in its electroplating bath. From the teaching of Passal, one skilled in the art would

NOT have been motivated to select only acetylenic compounds of Passal and replace the quaternary ammonium salt brightener of JP '693 with the acetylenic compounds.

In fact, Passal teaches that adding two acetylenic compounds to a Ni-Zn alloy-electroplating bath is not effective for improving the appearance of the Ni-Zn alloys. Passal specifically states:

A nickel electroplating bath composition was prepared by combining in water the following ingredients to provide the indicated concentrations (in g./l. unless otherwise indicated).

Ingredient:

NiSO ₄ ·7H ₂ O -----	300
NiCl ₂ ·6H ₂ O -----	60
H ₃ BO ₃ -----	45
Sodium saccharinate (0.6 mole H ₂ O) -----	3.8
Sodium allyl sulfonate -----	2.3
2-butyne-1,4-diol (mg./l.) -----	50
Bis-β-hydroxy ethyl ether of 2-butyne-1,4-diol (mg./l.) -----	25
N-1,2-dichloropropenylpyridinium chloride (mg./l.) -----	10
Sodium di-n-hexylsulfosuccinate -----	0.125
pH (electrometric) -----	3.8

...

To the above nickel electroplating bath composition was added an amount of zinc sulfate solution to produce a concentration of 0.08 g. /l. of Zn⁺⁺. The plating test was then repeated using an identical clean, polished, brass panel and employing the same plating conditions used prior to contamination of the nickel electroplating bath with zinc ions. **The resulting nickel electroplated panel had a dark, thin, and badly striated electrodeposit** on the low current density areas of the panel and it was apparent that the low current density coverage had been drastically reduced due to the presence of zinc ion as contaminant. (column 9, lines 1-40 of Passal, emphasis added)

Contrary to the Examiner's contention, one skilled in the art would NOT have been motivated to replace the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal since Passal explicitly teaches that "the resulting nickel electroplated panel had a dark, thin, and badly striated electrodeposit."

- iii. **There is no motivation to replace the quaternary ammonium salt of JP '693 with the acetylenic compound of Passal since there is no teaching or suggestion in Passal indicating that its acetylenic compounds would be effective for improving the appearance of quaternary alloys.**

One skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because there is NO teaching or suggestion in Passal indicating that its acetylenic brighteners would be effective for improving the appearance of quaternary Ni-Co-M1-M2 alloys (wherein M1 and M2 are two alloy metals). That is, there is NO teaching or suggestion in Passal indicating that its acetylenic brighteners cause the uniform placement of two additional metals within the matrix of quaternary Ni-Co-M1-M2 alloys.

In order to support the Examiner's combination, the Examiner cites functions (1) to (4) of Column 3 of Passal attributable to the primary brighteners, secondary brighteners, and secondary auxiliary brighteners. However, this contention is based only on impermissible hindsight, made with the guidance of the instant specification.

The beneficial functions (1) to (4) on page 10 of the Final Office Action dated October 13, 2005 are general desirable effects, and Passal indicates that these desirable effects provided by the listed primary brighteners, the listed secondary brighteners, and the listed secondary auxiliary brighteners. However, Passal fails to teach or suggest which specific beneficial functions (1) to (4) are enabled by the specifically listed primary brighteners, secondary brighteners, and secondary auxiliary brighteners. Moreover, Passal fails to teach or suggest

which specific beneficial functions (1) to (4) are enabled by acetylenic brighteners.

In this connection, Passal describes four generic groups and ten specific compounds of primary brighteners, four generic groups and five specific compounds of secondary brighteners, and twelve generic groups and seven specific compounds of auxiliary secondary brighteners. Passal fails to teach or suggest any specific function for any specific primary brighteners, secondary brighteners, and secondary auxiliary brighteners. Thus, there is no teaching or suggestion of any particular function of acetylenic brighteners by Passal. One skilled in the art would be hard-pressed to determine which of four beneficial functions are associated with each of the 20 generic groups and 22 specific compounds of brighteners listed.

In the absence of a specific teaching regarding the ability of acetylenic brighteners to improve the appearance of quaternary Ni-Co-M1-M2 alloys, one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal.

iv. There is no motivation to replace the quaternary ammonium salt of JP '693 with the acetylenic compound of Passal since the quaternary ammonium and acetylenic compound are not equivalent.

One skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because of resultant changes in bath conductivity that would impact plating efficiency. Acetylenic brighteners and quaternary ammonium salt brighteners are different and not equivalent. One general difference is the different impacts they have on bath conductivity. JP '693 employs quaternary ammonium salt brighteners, which are ionic brighteners. Since the salt brighteners of JP '693 contribute to the conductivity of its electroplating bath, one skilled in the art would NOT change the conductivity of JP '693 electroplating bath by substituting an acetylenic brightener for its quaternary ammonium salt brighteners. Changes in

bath conductivity would lead to changes in the metal deposition rates. Thus, there would be NO motivation for one skilled in the art to employ an acetylenic brightener in JP '693.

- v. **There is no motivation to replace the quaternary ammonium salt of JP '693 with the acetylenic compound of Passal since the proposed modification would frustrate the purpose and teachings of JP '693.**

One skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because this would FRUSTRATE the purpose and teachings of JP '693. The purpose of JP '693 is to provide an underlying Ni or Ni alloy coating on an electrode for tin electroplating. JP '693 is unconcerned with the appearance of the resultant Ni alloy since the Ni alloy is an underlying layer for tin electroplating on electrodes.

In the metal plating arts, having a matte or grainy surface means that the metal plate has a larger surface area and thus a greater ability to bond to a given substrate. Bright deposits do not have a large surface area, such as those possessed by matte surfaces. The main purpose of JP '693 is to improve the bonding of Ni alloys to an electrode and the bonding of tin to the Ni alloys. One skilled in the art would not have modified JP '693 by using a compound such as a brightener that would DECREASE the resultant Ni alloys ability to bond to an electrode and to be bonded by tin since the compound would decrease the surface area. In other words, one skilled in the art would NOT have frustrated the purpose of JP '693 by including an additive that would impede the bonding between its plated alloy and substrate.

One skilled in the art could not have arrived at the claimed invention based on the teachings of JP '693 and Passal because i) JP '693 and Passal fail to teach or suggest any quaternary alloys including quaternary Ni-Co alloys, ii) one skilled in the art would NOT have been motivated to replace the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal since Passal teaches that the addition of acetylenic compounds of Passal to a

bath results in “a dark, thin, and badly striated electrodeposit,” iii) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP ‘693 with the acetylenic brightener of Passal because there is NO teaching or suggestion in Passal indicating that its acetylenic brighteners would be effective for improving the appearance of quaternary Ni-Co-M1-M2 alloys, iv) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP ‘693 with the acetylenic brightener of Passal because of resultant changes in bath conductivity that would impact plating efficiency, and v) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP ‘693 with the acetylenic brightener of Passal because this would FRUSTRATE the purpose and teachings of JP ‘693.

Each of the five above-mentioned reasons provides an adequate basis to reverse the rejection.

B. Rejection of Claim 7 Under 35 U.S.C. §103(a)

Claim 7 stands rejected under 35 U.S.C. §103(a) over JP ‘693 in combination with Passal further in view of Hui. Reversal of this rejection is respectfully requested for at least the following reasons. In view of the forgoing, it is readily apparent that the cited art does not teach or suggest each and every feature of the claimed invention.

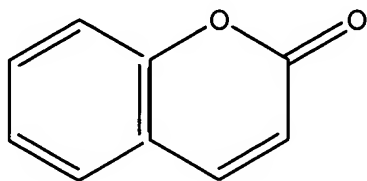
Claim 7 is NOT obvious over JP ‘693, Passal, and Hui for substantially the same reasons that claim 1 is not obvious over JP ‘693 and Passal. In particular, Hui does not make up for the aforementioned deficiencies of JP ‘693 and Passal with respect to the independent claim 1, from which claim 7 depends. As mentioned in the previous section, JP ‘693 and Passal fail to teach or suggest any quaternary alloys including quaternary Ni-Co alloys. Hui discloses a deposition of Ni-Fe-Co alloys. Thus, all claimed features as recited in claim 7 are not obvious over JP ‘693 and Passal in view of Hui. Accordingly, it is respectfully submitted that this rejection be reversed.

C. Rejection of Claims 9-12, 15-17, and 25 Under 35 U.S.C. §103(a)

Claims 9-12, 15-17, and 25 stand rejected under 35 U.S.C. §103(a) over JP '693 in view of Passal. Independent claim 9 and claims dependent therefrom are NOT obvious over JP '693 and Passal for substantially the same reasons that claim 1 is not obvious over JP '693 and Passal.

One skilled in the art could not have arrive at the claimed invention based on the teaching of JP '693 and Passal because i) JP '693 and Passal fail to teach or suggest any quaternary alloys including quaternary Ni-Co alloys, ii) one skilled in the art would NOT have been motivated to replace the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal since Passal teaches that the addition of acetylenic compounds of Passal to a bath results in "a dark, thin, and badly striated electrodeposit," iii) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because there is NO teaching or suggestion in Passal indicating that its acetylenic brighteners would be effective for improving the appearance of quaternary Ni-Co-M1-M2 alloys, iv) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because of resultant changes in bath conductivity that would impact plating efficiency, and v) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because this would FRUSTRATE the purpose and teachings of JP '693. Accordingly, it is respectfully submitted that this rejection be reversed.

The Examiner contends that "JP '693 teaches that the electroplating bath further comprises at least one organic brightener selected from the group consisting of ethylenic alcohols, coumarins, aldehydes, [and] compounds containing a C≡N linkage" (page 15, lines 4-7 of the Final Office Action dated October 13, 2005). JP '693 does not teach those compounds. For example, coumarins have the following chemical structure. JP '693 does not teach any coumarins.



coumarin

D. Rejection of Claim 13 Under 35 U.S.C. §103(a)

Claim 13 stands rejected under 35 U.S.C. §103(a) over JP '693 in combination with Passal further in view of SU 1,544,847 (hereinafter "SU '847"). Reversal of this rejection is respectfully requested for at least the following reasons. In view of the forgoing, it is readily apparent that the cited art does not teach or suggest each and every feature of the claimed invention.

Claim 13 is NOT obvious over JP '693, Passal, and SU '847 for substantially the same reasons that claim 9 is not obvious over JP '693 and Passal. In particular, SU '847 does not make up for the aforementioned deficiencies of JP '693 and Passal with respect to the independent claim 9, from which claim 13 depends. As mentioned in the previous section, JP '693 and Passal fail to teach or suggest any quaternary alloys including quaternary Ni-Co alloys. SU '847 discloses a betaine of 2-(4-pyridyl)ethanesulfonic-acid 0.3-1.5 g/L as an additive to acid electrolytes for producing composite coatings based on Ni-Co alloy. Thus, all claimed features as recited in claim 13 are not obvious over JP '693 and Passal in view of SU '847. Accordingly, it is respectfully submitted that this rejection be reversed.

E. Rejection of Claims 18-23 and 26 Under 35 U.S.C. §103(a)

Claims 18-23 and 26 have been rejected under 35 U.S.C. §103(a) over JP '693 in view of Passal. Independent claim 18 and claims dependent therefrom are NOT obvious over JP '693 and Passal for substantially the same reasons that claim 1 is not obvious over JP '693 and Passal.

One skilled in the art could not have arrive at the claimed invention based on the teaching of JP '693 and Passal because i) JP '693 and Passal fail to teach

or suggest any quaternary alloys including quaternary Ni-Co alloys, ii) one skilled in the art would NOT have been motivated to replace the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal since Passal teaches that the addition of acetylenic compounds of Passal to a bath results in "a dark, thin, and badly striated electrodeposit," iii) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because there is NO teaching or suggestion in Passal indicating that its acetylenic brighteners would be effective for improving the appearance of quaternary Ni-Co-M1-M2 alloys, iv) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because of resultant changes in bath conductivity that would impact plating efficiency, and v) one skilled in the art would NOT have replaced the quaternary ammonium salt brightener of JP '693 with the acetylenic brightener of Passal because this would FRUSTRATE the purpose and teachings of JP '693. Accordingly, it is respectfully submitted that this rejection be reversed.

With respect to claim 22, claim 22 is patentable for the additional reason that the contention of the Examiner that one skilled in the art would have modified the pH to improve tolerance to metallic ions as taught by Passal is faulty. Conductivity salts are neutral salts that change the ionic strength of the electroplating bath. Consequently, conductivity salts generally do not change the pH. Passal does not teach or suggest adding a conductivity salt to an electroplating bath.

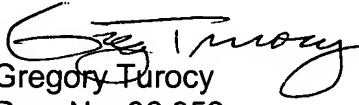
C. Conclusion

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited art. Accordingly, it is respectfully requested that the rejections of claims 1-13 and 15-26 be reversed.

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Respectfully submitted,
AMIN & TUROCY, LLP


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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A method of electroplating a quaternary alloy comprising nickel and cobalt, comprising:

providing an electroplating bath comprising an anode, a cathode, water, ionic nickel, ionic cobalt, at least two ionic alloy metals, and at least one acetylenic-brightener; and

applying a current to the electroplating bath whereby the quaternary alloy comprising nickel, cobalt, and at least two alloy metals forms on the cathode.

2. The method of claim 1, wherein the at least two ionic alloy metals comprise at least two metals selected from the group consisting of aluminum, antimony, bismuth, boron, copper, gallium, germanium, gold, indium, iridium, iron, lead, manganese, molybdenum, niobium, osmium, rhodium, ruthenium, scandium, silver, palladium, platinum, tantalum, thallium, tin, titanium, tungsten, vanadium, yttrium, zirconium, and zinc in ionic form.

3. The method of claim 1, wherein the acetylenic brightener is selected from the group consisting of acetylenic alcohols, acetylenic amines, acetylenic esters, acetylenic sulfonic acids and sulfonates, alkoxyated acetylenic alcohols, and acetylenic carboxylic acids.

4. The method of claim 1, wherein the electroplating bath further comprises at least one sulfur containing brightener selected from the group consisting of sulfinic acids, sulfonic acids, aromatic sulfonates, aromatic sulfinates, sulfonamides, sulfonimides, sulfimides, and sulfo-betaines.

5. The method of claim 1, wherein the electroplating bath has a pH from about 2 to about 6 and a temperature from about 10 °C to about 90 °C, and a

current density of about 1 ASF or more and about 500 ASF or less is applied to the electroplating bath.

6. The method of claim 1, wherein the electroplating bath comprises about 10 g/l or more and about 150 g/l or less of ionic nickel, about 0.5 g/l or more and about 70 g/l or less of ionic cobalt, about 0.01 g/l or more and about 20 g/l or less of each of the ionic alloy metals, and from about 0.001 % to about 5 % by weight of at least one acetylenic brightener.

7. The method of claim 1, wherein the anode comprises at least one of nickel, cobalt, at least one alloy metal, iridium oxide, platinum, titanium, graphite, carbon, and platinum-titanium.

8. The method of claim 1, wherein the quaternary alloy comprises about 2 % by weight or less of components other than nickel, cobalt, and the at least two alloy metals.

9. A method of forming an alloy comprising nickel, cobalt, and at least two alloy metals, comprising:

providing an electroplating bath comprising an anode, a cathode, water, about 40 g/l or more and about 100 g/l or less of ionic nickel, about 1 g/l or more and about 30 g/l or less of ionic cobalt, and about 0.05 g/l or more and about 10 g/l or less of each of at least two ionic alloy metals, and from about 0.005 % to about 2.5 % by weight of at least one acetylenic brightener; and

applying a current to the electroplating bath whereby the alloy comprising nickel, cobalt, and at least two alloy metals forms on the cathode.

10. The method of claim 9, wherein the electroplating bath has a pH from about 3 to about 5 and a temperature from about 30 °C to about 80 °C, and a current density of about 10 ASF or more and about 200 ASF or less is applied to the electroplating bath.

11. The method of claim 9, wherein the electroplating bath further comprises at least one sulfur containing brightener selected from the group consisting of sulfinic acids, sulfonic acids, aromatic sulfonates, aromatic sulfinates, sulfonamides, sulfonimides, sulfimides, and sulfo-betaines.
12. The method of claim 9, wherein the acetylenic brightener is selected from the group consisting of acetylenic alcohols, acetylenic amines, acetylenic esters, acetylenic sulfonic acids and sulfonates, alkoxylated acetylenic alcohols, and acetylenic carboxylic acids.
13. The method of claim 9, wherein the electroplating bath further comprises a sulfo-betaine brightener.
14. (canceled)
15. The method of claim 9, wherein the electroplating bath further comprises at least one organic brightener selected from the group consisting of ethylenic alcohols, coumarins, aldehydes, compounds containing a C≡N linkage, and heterocyclics.
16. The method of claim 9, wherein the at least two ionic alloy metals comprise at least two metals selected from the group consisting of aluminum, antimony, bismuth, boron, copper, gallium, germanium, gold, indium, iridium, iron, lead, manganese, molybdenum, niobium, osmium, rhodium, ruthenium, scandium, silver, palladium, platinum, tantalum, thallium, tin, titanium, tungsten, vanadium, yttrium, zirconium, and zinc in ionic form.
17. The method of claim 9, wherein the at least two ionic alloy metals comprise iron and boron in ionic form.

18. A method of plating a substrate with an alloy comprising nickel, cobalt, and at least two alloy metals, comprising:

providing an electroplating bath comprising an anode, a cathode substrate, water, ionic nickel, ionic cobalt, at least two ionic alloy metals, and at least two brighteners selected from the group consisting of sulfur containing brighteners and acetylenic brighteners; and

applying a current to the electroplating bath whereby the alloy comprising nickel, cobalt, and at least two alloy metals forms on the cathode substrate.

19. The method of claim 18, wherein the at least two ionic alloy metals comprise at least two metals selected from the group consisting of aluminum, antimony, bismuth, boron, copper, gallium, germanium, gold, indium, iridium, iron, lead, manganese, molybdenum, niobium, osmium, rhodium, ruthenium, scandium, silver, palladium, platinum, tantalum, thallium, tin, titanium, tungsten, vanadium, yttrium, zirconium, and zinc in ionic form.

20. The method of claim 18, wherein the acetylenic brightener is selected from the group consisting of acetylenic alcohols, acetylenic amines, acetylenic esters, acetylenic sulfonic acids and sulfonates, alkoxylated acetylenic alcohols, and acetylenic carboxylic acids.

21. The method of claim 18, wherein the sulfur containing brightener is selected from the group consisting of sulfinic acids, sulfonic acids, aromatic sulfonates, aromatic sulfinates, sulfonamides, sulfonimides, sulfimides, and sulfo-betaines.

22. The method of claim 18, wherein the electroplating bath further comprises at least one conductivity salt.

23. The method of claim 22, wherein the conductivity salt is selected from the group consisting of boric acid, sodium sulfate, sodium chloride, potassium sulfate, and potassium chloride.

24. The method of claim 1, wherein the acetylenic brightener is selected from the group consisting of ethoxylated butynediol; 2-butyne-1,4-diol; propargyl alcohol; ethoxylated propargyl alcohol; hydroxyethyl propynyl ether; beta-hydroxypropyl, propynyl ether; gamma-propynyloxy, bis-beta-hydroxyethyl ether 2-butyne-1,4-diol; bis-beta-hydroxypropyl ether 2-butyne-1,4-diol; 1,4-di-(beta-hydroxyethoxy)-2-butyne; 1,4-di-(beta-hydroxy-gamma-chloropropoxy)-2-butyne; 1,4-di-(beta-gamma-epoxypropoxy)-2-butyne; 1,4-di-(beta-hydroxy-gamma-butenoxy)-2-butyne; 1,4-di-(2'-hydroxy-4'-oxa-6'-heptenoxy)-2-butyne; 2,4,6-trimethyl N-propargyl pyridinium bromide; 2-methyl-3-butyne-2-ol; 1-(beta-hydroxyethoxy)-2-propyne; and 1-(beta-hydroxypropoxy)-2-propyne.

25. The method of claim 9, wherein the acetylenic brightener is selected from the group consisting of ethoxylated butynediol; 2-butyne-1,4-diol; propargyl alcohol; ethoxylated propargyl alcohol; hydroxyethyl propynyl ether; beta-hydroxypropyl, propynyl ether; gamma-propynyloxy, bis-beta-hydroxyethyl ether 2-butyne-1,4-diol; bis-beta-hydroxypropyl ether 2-butyne-1,4-diol; 1,4-di-(beta-hydroxyethoxy)-2-butyne; 1,4-di-(beta-hydroxy-gamma-chloropropoxy)-2-butyne; 1,4-di-(beta-gamma-epoxypropoxy)-2-butyne; 1,4-di-(beta-hydroxy-gamma-butenoxy)-2-butyne; 1,4-di-(2'-hydroxy-4'-oxa-6'-heptenoxy)-2-butyne; 2,4,6-trimethyl N-propargyl pyridinium bromide; 2-methyl-3-butyne-2-ol; 1-(beta-hydroxyethoxy)-2-propyne; and 1-(beta-hydroxypropoxy)-2-propyne.

26. The method of claim 18, wherein the acetylenic brightener is selected from the group consisting of ethoxylated butynediol; 2-butyne-1,4-diol; propargyl alcohol; ethoxylated propargyl alcohol; hydroxyethyl propynyl ether; beta-hydroxypropyl, propynyl ether; gamma-propynyloxy, bis-beta-hydroxyethyl ether 2-butyne-1,4-diol; bis-beta-hydroxypropyl ether 2-butyne-1,4-diol; 1,4-di-(beta-

hydroxyethoxy)-2-butyne; 1,4-di-(beta-hydroxy-gamma-chloropropoxy)-2-butyne; 1,4-di-(beta-gamma-epoxypropoxy)-2-butyne; 1,4-di-(beta-hydroxy-gamma-butenoxy)-2-butyne; 1,4-di-(2'-hydroxy-4'-oxa-6'-heptenoxo)-2-butyne; 2,4,6-trimethyl N-propargyl pyridinium bromide; 2-methyl-3-butyn-2-ol; 1-(beta-hydroxyethoxy)-2-propyne; and 1-(beta-hydroxypropoxy)-2-propyne.

IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.